In the Claims

1-9. (Canceled)

10. (Currently Amended) The machine readable medium of claim [[9]] 13 wherein the L2TP encapsulated Ethernet frame is transmitted on one of a plurality of sessions of a non-homogenous tunnel.

11. (Currently Amended) The machine readable medium of claim [[9]] 13 wherein transmitting the Ethernet frame further comprises transmitting attribute value pairs (AVPs) in relation to the Ethernet frame.

12. (Currently Amended) The machine readable medium of claim [[9]] 13 wherein transmitting the frame comprises:

 establishing an Ethernet capable L2TP tunnel; and

 establishing an L2TP session to carry the frame; and

 transmitting a MAC address.

13. (Currently Amended) A ~~The~~ machine readable medium ~~of claim 9 further comprising~~ that provides instructions, which when executed by a set of processors, cause said set of processors to perform operations comprising:

 encapsulating an Ethernet frame in Layer 2 Tunneling Protocol (L2TP);

 transmitting the L2TP encapsulated Ethernet frame over a network;

 decapsulating the Ethernet frame from L2TP; and

 performing session fail retry.

14. (Canceled)

15. (Currently Amended) The machine readable medium of claim ~~14~~ 18 wherein the L2TP tunnel is non-homogenous.

16. (Currently Amended) The machine readable medium of claim ~~14~~ 18 wherein establishing the L2TP session comprises performing session fail retry.

17. (Currently Amended) The machine readable medium of claim ~~14~~ 18 wherein establishing the L2TP tunnel capable of carrying the Ethernet frame comprises transmitting an L2TP control message indicating a tunnel capable of carrying the Ethernet frame.

18. (Currently Amended) ~~The~~ A machine readable medium ~~of claim 14 further comprising~~ that provides instructions, which when executed by a set of processors, cause said set of processors to perform operations comprising:

establishing a Layer 2 Tunneling Protocol (L2TP) tunnel capable of carrying an Ethernet frame;
establishing an L2TP session to carry the Ethernet frame;
transmitting the Ethernet frame in L2TP encapsulation over the L2TP session;
decapsulating the frame; and
performing session fail retry.

19. (Original) A machine readable medium that provides instructions, which when executed by a set of processors, cause said set of processors to perform operations comprising:

transmitting a first tunnel control message for Layer 2 Tunneling Protocol (L2TP) tunnel setup having an attribute value pair (AVP) indicating Ethernet frame capability, receiving a second tunnel control message for L2TP tunnel setup having an AVP indicating Ethernet frame capability;

transmitting a session control message having an AVP indicating an L2TP Ethernet session and an AVP indicating an Ethernet Media Access Control (MAC) address; and

transmitting an Ethernet frame with the L2TP Ethernet session.

20. (Original) The machine readable medium of claim 19 further comprising performing session fail retry before transmitting the Ethernet frame.

21. (Original) The machine readable medium of claim 19 wherein transmitting the first and second tunnel control messages comprises manipulating the bits of the first and second tunnel control messages.

22. (Canceled)

23. (Currently Amended) The machine readable medium of claim ~~22~~ 24 wherein the tunnel is non-homogenous.

24. (Currently Amended) ~~The~~ A machine readable medium ~~of claim 22~~ that provides instructions, which when executed by a set of processors, cause said set of processors to perform operations comprising:

establishing an Ethernet capable Layer 2 Tunneling Protocol (L2TP) tunnel, wherein establishing the Ethernet capable L2TP tunnel comprises[[:]],

receiving a first tunnel control message indicating Ethernet capability; and

transmitting a second tunnel control message indicating Ethernet frame capability;

accepting an L2TP session;

receiving an L2TP encapsulated Ethernet frame over the session;

decapsulating the Ethernet frame; and

associating the Ethernet frame to a virtual circuit structure.

25. (Currently Amended) ~~The~~ A machine readable medium ~~of claim 22~~ that provides instructions, which when executed by a set of processors, cause said set of processors to perform operations comprising:

establishing an Ethernet capable Layer 2 Tunneling Protocol (L2TP) tunnel;

accepting an L2TP session, wherein accepting the L2TP session comprises[[:]],

receiving a session control message indicating session type and an Ethernet MAC address; and

creating a virtual circuit structure in response to the control message;

receiving an L2TP encapsulated Ethernet frame over the session;

decapsulating the Ethernet frame; and

associating the Ethernet frame to a virtual circuit structure.

26. (Currently Amended) The machine readable medium of claim 22 24 further comprising extracting a set of data from the Ethernet frame.

27. (Currently Amended) The A machine readable medium of claim 22 that provides instructions, which when executed by a set of processors, cause said set of processors to perform operations comprising:

establishing an Ethernet capable Layer 2 Tunneling Protocol (L2TP) tunnel;

accepting an L2TP session;

receiving an L2TP encapsulated Ethernet frame over the session;

decapsulating the Ethernet frame; and

associating the Ethernet frame to a virtual circuit structure, wherein the associating the Ethernet frame to the virtual circuit structure comprises processing the Ethernet frame as indicated by the virtual circuit structure.

28. (Original) A machine readable medium that provides instructions, which when executed by a set of processors, cause said set of processors to perform operations comprising:

receiving a first Layer 2 Tunneling Protocol tunnel control message having an attribute value pair (AVP) indicating Ethernet capability;

transmitting a second L2TP tunnel control message having an AVP indicating Ethernet capability;

receiving a session control message having an AVP indicating a session type and an Ethernet MAC address;

creating a virtual circuit structure for the session type in response to the session control message; and

processing an L2TP packet having a payload with the virtual circuit structure.

29. (Original) The machine readable medium of claim 28 wherein processing the L2TP packet comprises:

decapsulating the payload from the L2TP packet; and

processing the payload as indicated by the virtual circuit structure.

30. (Original) The machine readable medium of claim 28 wherein the first and second control messages include values requested by a customer.

31. (Canceled)

32. (Currently Amended) The machine readable medium of claim 3+ 34 wherein the L2TP tunnel is non-homogenous.

33. (Canceled)

34. (Currently Amended) The An apparatus of claim 33 comprising:

an Layer 2 Tunneling Protocol Network Server (LNS); and

a Layer 2 Tunneling Protocol (L2TP) Access Concentrator (LAC) to transmit an Ethernet frame over an L2TP tunnel, wherein the LAC to transmit the Ethernet frame comprises,

establishing an L2TP tunnel capable of carrying an Ethernet over L2TP session, wherein establishing the tunnel capable of carrying an Ethernet over L2TP session comprises[[:]],

the LAC transmitting a first tunnel control message to the LNS indicating Ethernet frame capability, and

the LNS transmitting a second[[,]] tunnel control message to the LAC indicating Ethernet frame capability; and

establishing an Ethernet over L2TP session to the LNS, the LNS to receive the Ethernet frame from the L2TP tunnel originating at the LAC.

35. (Currently Amended) The apparatus of claim ~~33~~ 34 wherein the establishing the Ethernet over L2TP session to the LNS comprises the LAC transmitting to the LNS a session control message indicating Ethernet encapsulation and an Ethernet Media Access Control (MAC) address for the LAC.

36. (Original) A Layer 2 Tunneling Protocol (L2TP) Access Concentrator (LAC) comprising:

an operating system to establish an Ethernet capable L2TP tunnel with a peer, to perform session fail retry;

to establish an Ethernet over L2TP session in the tunnel, to encapsulate an Ethernet frame with L2TP; and

a circuit to transmit the session.

37. (Original) The LAC of claim 36 wherein to establish the Ethernet over L2TP session comprises transmitting signals, the signals including requested values.

38. (Original) The LAC of claim 36 wherein the tunnel is non-homogenous.

39. (Original) The LAC of claim 36 wherein to establish the Ethernet capable L2TP tunnel comprises:

transmitting a first tunnel control message indicating Ethernet frame capability; and

receiving a second tunnel control message indicating Ethernet frame capability.

40. (Original) The LAC of claim 36 wherein to establish the Ethernet over L2TP session in the tunnel comprises transmitting a session control message indicating Ethernet encapsulation and an Ethernet MAC address for the LAC.

41. (Canceled)

42. (Currently Amended) The LNS of claim 41 43 wherein the tunnel is non-homogenous.

43. (Currently Amended) The A Layer 2 Tunneling Protocol (L2TP) Network Server (LNS) of claim 41 comprising:

an operating system to establish an Ethernet capable L2TP tunnel, wherein the operating system to establish the Ethernet capable L2TP tunnel comprises[[:]]:

receiving a first tunnel control message indicating Ethernet capability; and

transmitting a second tunnel control message indicating Ethernet capability;

a circuit to receive an Ethernet over L2TP packet having an Ethernet frame as a payload; and

a logic to process the packet.

44. (Currently Amended) The A Layer 2 Tunneling Protocol (L2TP) Network Server (LNS) of claim 41 comprising:

an operating system to establish an Ethernet capable L2TP tunnel;

a circuit to receive an Ethernet over L2TP packet having an Ethernet frame as a payload; and

a logic to process the packet, wherein the logic to process the packet comprises[[:]]:

decapsulating the payload from L2TP encapsulation;

associating the payload with a virtual circuit structure; and

processing the payload as indicated by the virtual circuit structure.

45-47. (Canceled)

48. (Original) A computer implemented method comprising:

transmitting a first tunnel control message for Layer 2 Tunneling Protocol (L2TP) tunnel setup having an attribute value pair (AVP) indicating Ethernet frame capability,

receiving a second tunnel control message for L2TP tunnel setup having an AVP indicating Ethernet frame capability;

transmitting a session control message having an AVP indicating an L2TP Ethernet session and an Ethernet Media Access Control (MAC) address; and

transmitting an Ethernet frame with the L2TP Ethernet session.

49. (Original) The method of claim 48 further comprising performing AAA retry before transmitting the Ethernet frame.

50. (Original) The method of claim 48 wherein transmitting the first and second tunnel control messages comprises manipulating the bits of the first and second tunnel control messages.

51. (New) The method of claim 25, wherein the tunnel is non-homogenous.

52. (New) The method of claim 25, further comprising extracting a set of data from the Ethernet frame.

53. (New) The method of claim 27, wherein the tunnel is non-homogenous.

54. (New) The method of claim 27, further comprising extracting a set of data from the Ethernet frame.

55. (New) A method comprising:

encapsulating an Ethernet frame in Layer 2 Tunneling Protocol (L2TP);

transmitting the L2TP encapsulated Ethernet frame over a network;

decapsulating the Ethernet frame from L2TP; and

performing session fail retry.

56. (New) The method of claim 55, wherein the L2TP encapsulated Ethernet frame is transmitted on one of a plurality of sessions of a non-homogenous tunnel.

57. (New) The method of claim 55, wherein transmitting the Ethernet frame further comprises transmitting attribute value pairs (AVPs) in relation to the Ethernet frame.

58. (New) The method of claim 55, wherein transmitting the frame comprises:
 establishing an Ethernet capable L2TP tunnel; and
 establishing an L2TP session to carry the frame; and
 transmitting a MAC address.

59. (New) A method comprising:
 establishing a Layer 2 Tunneling Protocol (L2TP) tunnel capable of carrying an Ethernet frame;
 establishing an L2TP session to carry the Ethernet frame;
 transmitting the Ethernet frame in L2TP encapsulation over the L2TP session;
 decapsulating the frame; and
 performing session fail retry.

60. (New) The method of claim 59, wherein the L2TP tunnel is non-homogenous.

61. (New) The method of claim 59, wherein establishing the L2TP session comprises performing session fail retry.

62. (New) The method of claim 59, wherein establishing the L2TP tunnel capable of carrying the Ethernet frame comprises transmitting an L2TP control message indicating a tunnel capable of carrying the Ethernet frame.

63. (New) A method comprising:
 transmitting a first tunnel control message for Layer 2 Tunneling Protocol (L2TP) tunnel setup having an attribute value pair (AVP) indicating Ethernet frame capability,

receiving a second tunnel control message for L2TP tunnel setup having an AVP indicating Ethernet frame capability;

transmitting a session control message having an AVP indicating an L2TP Ethernet session and an AVP indicating an Ethernet Media Access Control (MAC) address; and

transmitting an Ethernet frame with the L2TP Ethernet session.

64. (New) The method of claim 63, further comprising performing session fail retry before transmitting the Ethernet frame.

65. (New) The method of claim 63, wherein transmitting the first and second tunnel control messages comprises manipulating the bits of the first and second tunnel control messages.

66. (New) A method comprising:

establishing an Ethernet capable Layer 2 Tunneling Protocol (L2TP) tunnel, wherein establishing the Ethernet capable L2TP tunnel comprises:

receiving a first tunnel control message indicating Ethernet capability; and

transmitting a second tunnel control message indicating Ethernet frame capability;

accepting an L2TP session;

receiving an L2TP encapsulated Ethernet frame over the session;

decapsulating the Ethernet frame; and

associating the Ethernet frame to a virtual circuit structure.

67. (New) The method of claim 66, wherein the tunnel is non-homogenous.

68. (New) The method of claim 66, further comprising extracting a set of data from the Ethernet frame.

69. (New) A method comprising:

establishing an Ethernet capable Layer 2 Tunneling Protocol (L2TP) tunnel;

accepting an L2TP session, wherein accepting the L2TP session comprises receiving a session control message indicating session type and an Ethernet MAC address and creating a virtual circuit structure in response to the control message;

receiving an L2TP encapsulated Ethernet frame over the session;

decapsulating the Ethernet frame; and

associating the Ethernet frame to a virtual circuit structure.

70. (New) The method of claim 69, wherein the tunnel is non-homogenous.

71. (New) The method of claim 69, further comprising extracting a set of data from the Ethernet frame.

72. (New) A method comprising:

establishing an Ethernet capable Layer 2 Tunneling Protocol (L2TP) tunnel;

accepting an L2TP session;

receiving an L2TP encapsulated Ethernet frame over the session;

decapsulating the Ethernet frame; and

associating the Ethernet frame to a virtual circuit structure, wherein the associating the Ethernet frame to the virtual circuit structure comprises processing the Ethernet frame as indicated by the virtual circuit structure.

73. (New) The method of claim 72, wherein the tunnel is non-homogenous.

74. (New) The method of claim 72, further comprising extracting a set of data from the Ethernet frame.

75. (New) A method comprising:

receiving a first Layer 2 Tunneling Protocol tunnel control message having an attribute value pair (AVP) indicating Ethernet capability;

transmitting a second L2TP tunnel control message having an AVP indicating Ethernet capability;

receiving a session control message having an AVP indicating a session type and an Ethernet MAC address;

creating a virtual circuit structure for the session type in response to the session control message; and

processing an L2TP packet having a payload with the virtual circuit structure.

76. (New) The method of claim 75, wherein processing the L2TP packet comprises:

decapsulating the payload from the L2TP packet; and

processing the payload as indicated by the virtual circuit structure.

77. (New) The method of claim 75, wherein the first and second control messages include values requested by a customer.